EdgeAccess®
Universal Chassis System

CANOGA PERKINS

Model 2370
High-Speed Universal Fiber Optic Modem
User Manual

CAUTION!

This product may contain a laser diode operating at a wavelength of 1300nm - 1600nm. Use of optical instruments (e.g., collimating optics) with this product may increase eye hazard. Use of controls or adjustments, or performing procedures other than those specified herein may result in hazardous radiation exposure.

Under normal conditions, the radiation levels emitted by this product are under Class 1 limits in 21 CFR Chapter 1, Subchapter J.

ATTENCION!

Cet équipement peut avoir une diode laser émettant à des longueurs d'onde allant de 1300nm à 1600nm. L'utilisation d'instruments optiques (par exemple : un collimateur optique) avec cet équipement peut s'avèrer dangereuse pour les yeux. Procéder à des contrôles, des ajustements ou toute procédure autre que celles décrites ci-après peut provoquer une exposition dangereuse à des radiations.

Sous des conditions normales, le niveau des radiations émises par cet équipement est en dessous des limites prescrites dans CFR21, chapitre 1, sous chapitre J.

NOTICE!

This device contains static sensitive components. It should be handled only with proper ElectroStatic Discharge (ESD) grounding procedures.

NOTE!

Cet équipement contient des composants sensibles aux décharges électro-statiques. Il doit absolument être manipulé en respectant les règles de mise à la terre afin de prévenir de telles décharges.

NOTICE

Canoga Perkins has prepared this users manual for use by customers and Canoga Perkins personnel as a guide for the proper installation, operation and/or maintenance of Canoga Perkins equipment. The drawings, specifications and information contained in this document are the property of Canoga Perkins and any unauthorized use or disclosure of such drawings, specifications and information is prohibited.

Canoga Perkins reserves the right to change or update the contents of this manual and to change the specifications of its products at any time without prior notification. Every effort has been made to keep the information in this document current and accurate as of the date of publication or revision. However, no guarantee is given or implied that the document is error free or that is accurate with regard to any specification.

Canoga Perkins Corporation

20600 Prairie Street
Chatsworth, California 91311-6008

Business Phone: (818) 718-6300
(Monday - Friday 7 a.m. - 5 p.m. Pacific Time)
FAX: (818) 718-6312 (24hrs.)
Web Site: www.canoga.com
Email: fiber@canoga.com

Copyright© 2003, 2004 Canoga Perkins Corporation
All Rights Reserved

EdgeAccess®
Universal Chassis System
Model 2370
User Manual

Model Number 2370-UM

Product Number 6913151

Rev. E 01/2008

Table of Contents

Chapter 1 Overview 1-1
1.1 Modem Operation 1-2
1.2 Fiber Optic Options 1-3
1.3 Features 1-3
Chapter 2 Installation and Setup 2-1
2.1 Installation 2-1
2.2 Power Up and Front Panel Functions 2-2
Chapter 3 Electrical Data Interfaces 3-1
3.1 L130: Configurable EIA-232/423/530/P53/449/V35 3-1
3.2 P53 Interface for the L130 3-3
3.3 L131: EIA-422, DC-37 With Control Signals 3-5
3.4 L132: EIA-422, TwinAx 3-6
3.5 L133: TTL, BNC 3-6
3.6 L134, L135, L136, L137: T1 and E1 3-7
3.7 L138: EIA-422, DC-37 Without Control Signals 3-8
3.8 L139: T88 3-8
3.9 Operating Modes and Transmit/Receive Timing 3-8
Chapter 4 Software Management 4-1
4.1 VT100 Terminal Emulation 4-1
4.2 PC Configuration for Terminal Operation 4-1
4.3 Management User Interface 4-2
4.3.1 General Screen Format 4-2
4.3.2 User Interface Organization 4-3
4.3.3 Login Screen and DMM Main Menu 4-3
4.4 2370 Main Menu 4-4
4.5 System Configuration 4-4
4.6 Hardware Configuration 4-5
4.7 Functional Configuration 4-5
4.8 Trap Configuration 4-9
4.9 Alarm Output Configuration 4-10
4.10 SNMP Configuration 4-11
4.11 Host Table 4-12
4.12 Diagnostics 4-13
4.13 Interface Status 4-14
4.14 Link Error Counters 4-14
4.15 System Alarms 4-16
4.16 Utilities 4-17
4.17 PING 4-18
4.18 Software Upgrade 4-18
Chapter 5 Troubleshooting 5-1

5.1 Loopback Tests 5-2
5.2 Optical Power and BERT Tests 5-2
5.3 Fiber Optic Diagnostics 5-3

Chapter 6 Specifications 6-1

6.1 Optical 6-1
6.2 Electrical 6-1
6.3 Physical / Environmental 6-2
6.4 Modem Configurations 6-3

Appendix A Warranty Information A-1

List of Figures

Figure 1. Model 2370 Modem 1-2
Figure 2. P53 Interface for External Station Clock 3-3
Figure 3. P53 Interface for Internal Clock 3-4
Figure 4. P53 Interface for External Function 3-4
Figure 5. External Operating Mode 3-9
Figure 6. Internal Operating Mode 3-9
Figure 7. Slave Operating Mode 3-10
Figure 8. General Screen Format 4-2
Figure 9. 2370 Main Menu 4-4
Figure 10. System Configuration Menu 4-4
Figure 11. Hardware Configuration Screen 4-5
Figure 12. Functional Configuration Screen 4-6
Figure 13. Trap Configuration Screen 4-9
Figure 14. Alarm Output Configuration Screen 4-10
Figure 15. SNMP Configuration Screen 4-11
Figure 16. Host Table Screen 4-12
Figure 17. Diagnostics Screen 4-13
Figure 18. Interface Status Screen 4-14
Figure 19. Link Error Counters Screen 4-15
Figure 20. System Alarms Screen 4-16
Figure 21. Utilities Menu Screen 4-17
Figure 22. PING Generation Screen 4-18
Figure 23. Software Upgrade Screen 4-18
Figure 24. Local Loopback 5-2
Figure 25. Remote Loopback 5-2

List of Tables

Table 1. 2370 LED Functions 2-2
Table 2. Signals and Pinouts: EIA-423/232, -530 Protocols and EIA-449/42 and V.35 Adapters 3-2
Table 3. EIA-449 Interface DC-37 Pin Assignments 3-5

Table 4. EIA-422 Interface TwinAx Signals....3-6
Table 5. TTL/BNC Signals....3-6
Table 6. RJ-48 Pinout....3-7
Table 7. DA-15 Pinout....3-7
Table 8. T1 and E1 ELIM Status LEDs....3-7
Table 9. EIA-422, Without Control Signals, DC-37 Pin Assignments....3-8
Table 10. EIA-422 Interface TwinAx Signals....3-8
Table 11. System Configuration Option Definitions....4-5
Table 12. Functional Configuration Option Definitions....4-6
Table 13. Interface Configuration Parameters and Values....4-7
Table 14. Trap Definitions....4-9
Table 15. Alarm Output Definitions....4-10
Table 16. SNMP Configuration Parameters Description....4-11
Table 17. Diagnostics Screen Definitions....4-13
Table 18. Link Error Counters Definitions....4-15
Table 19. System Alarms Definitions....4-16
Table 20. Utilities Menu Options....4-17
Table 21. Symptoms With Possible Causes and Actions....5-1
Table 22. RJ-45 Pinout....6-2

Chapter 1
Overview

The Model 2370 universal fiber optic modem provides full-duplex operation at speeds up to 20 Mbps and distances up to 120 Km, depending on the rate and mode selections.

The 2370 operates with these electrical line interface modules (ELIM):

- EIA-530 and EIA-530-A
- EIA-423A and EIA-232D
- EIA 449 and EIA-422
- CCITT V.35
- EIA-530/Model P53 supports:
  - External station Clock
  - Internal Clock
  - External Clock
- EIA-422A/Model T22
- EIA-422A/Model D22
- TTL/BNC
- T1/E1
- T88

Use the 2370 with the Universal Chassis System (UCS) in the UCS 1000, UCS 1001, or Model 1040 or 1050 Standalone Enclosure. The UCS 1000 will hold up to 15 modems, the UCS 1001 can hold up to two modems, and a standalone enclosure holds one modem. Figure 1 shows the 2370 modem.

Figure 1. Model 2370 Modem

1.1 Modem Operation

The electrical connection between the network equipment and the 2370 differs according to the electrical line interface module (ELIM). The conversion between electrical and optical signals is similar in all applications. The modem multiplexes the clock, data, and control lead inputs from the ELIM, then adds framing and supervisory information. The optical receiver extracts the clock and data information from the optical signal, establishes the frame-bit lock, then demultiplexes the clock, data, control signals, and routes the signals to the interface circuits.

The 2370 operates asynchronously at up to 15 Mbps and synchronously at up to 20 Mbps. Operation mode options include external, internal, and slave timing. The built-in clock can generate the common clock rates, including most Nx56/Nx64K rates.

1.2 Fiber Optic Options

The 2370 includes one fiber-optic transmitter and receiver. Use the 2370 with multimode or single mode fiber optic cable and SC or ST connectors, depending on the transmitter option. The transmitter options include:

- Single Mode, at 1310 nm and 1550 nm
- Multimode, at 1310 nm
- CWDM

For descriptions of the options by model number, see Chapter 6.

1.3 Features

The 2370 supports these features:

- Status LEDs
- Console port for accessing management functions through SLIP, PPP, SNMP
- Redundancy: Two modems at each end of the link provide full redundancy in these modes of operation:
  - Auto Switchover Monitors the link; if the active modem fails, switches automatically to the inactive modem
  - Manual Primary Makes the primary modem active
  - Manual Secondary Makes the secondary modem active
  - Off Disables redundancy
- ELIM connector adapters for P53
- Local and Remote loopback for test
- TRM/MDM and Reset switches

Chapter 2
Installation and Setup

The 2370 can be installed in a UCS 1000, UCS 1001, or Model 1040 or 1050 enclosure. For details on the chassis, see the manual for the chassis. The process to install a 2370 is the same for all chassis options.

2.1 Installation

Follow these steps to install the 2370 and ELIM:

1. Unpack and inspect all components. Save the shipping carton and packing materials in case you need to return the equipment to the manufacturer. Appendix A provides information for Return Material Authorization (RMA).

2. Insert the 2370 into an unused slot in the chassis. Slide the 2370 into the rails and push it firmly into the backplane, then tighten the captive screws. If you encounter resistance, check that no connector pins are bent.

If you encounter more difficulty, contact Canoga Perkins at (818) 718-6300 for technical assistance.

3. Insert the ELIM into the 2370. Slide the ELIM into the rails and push it firmly into the connector, then tighten the captive screw. If you encounter resistance, check that no connector pins are bent.

Note: The 2370 and ELIM are hot-swappable and can be inserted or removed without disrupting data transfer in other modules in the chassis.

The 2370 uses electrical cables to connect to the local site and fiber optic cables to connect to the remote modem. Follow these steps to connect the electrical and optical cables:

4. If you will control the 2370 directly through the serial port, plug a DE-9 straight-through serial cable into the EIA-232 port on the DMM and the serial port on the PC or terminal; for the pinout, see Table 22 on page 6-2.

5. To connect to the local site, plug the electrical interface cables from the local equipment into the Rx and Tx connectors using Tx to Rx, and Rx to Tx orientation.

Dirty optical connectors are a common source of link loss or attenuation problems, especially for single mode fiber (SMF). Clean the connectors before plugging in a cable and whenever there is a significant or unexplained light loss. To prevent contamination, always install protective dust covers on unused fiber optic connectors.

6. Wipe the ferrule and the end-face surface of the male fiber coupler with a lint-free isopropyl alcohol pad from a fiber cleaning kit.

7. Use canned air to blow out any dust from the female fiber coupler.

Caution: ***To avoid damaging the fiber end-surface or connector, use extreme care when installing or removing cables.***

8. Plug in the optical cables:
   - If you have a simplex optical connector, use a single strand, single mode fiber cable between a pair of 2370 modems, one at 1310 nm wavelength and the other at 1550 nm wavelength.
   - If you have a duplex connector, use Tx to Rx, and Rx to Tx orientation.
9. Label each cable and connector with a signal name and direction.
10. For cable connections to other modules in the chassis, see the appropriate user manual for details.

2.2 Power Up and Front Panel Functions

During the initial power-up sequence, all LEDs light amber. When start-up is complete, the setup and installation are correct, and data is transmitting normally across the link, the STA LED lights green and the CFG, CLS, and TST LEDs are off. During normal operation, the LED colors change according to system and port conditions. The STA, CFG, and TST LEDs show the module condition. The CLS LED shows the optical signal conditions. Table 1 shows the LED states for various conditions.

Table 1. 2370 LED Functions

LED	Status	Description
STA	Off	No power
	Green	Normal operation
	Amber	Inactive (redundant modem)
	Red	Failed system self-test
CFG	Off	Normal operation
	Red	Software mismatch between local and remote modems, improperly connected fiber optic cable, or setup mismatch between local and remote modems
CLS	Off	Normal operation
	Red	Local loss of optical sync
	Red blinking	Remote loss of optical sync
TST	Off	Normal operation
	Amber	Local loopback (optical or electrical)
	Amber blinking	Remote loopback (optical or electrical)

Chapter 3
Electrical Data Interfaces

The 2370 supports these ELIMs:

- L130 Configurable EIA-232/423/530/P53/449/V35
- P53 Interface for the L130
- L131 EIA-422 DC-37 with controls
- L132 EIA-422 TwinAx
- L133 TTL BNC
- L134 T1 RJ-45
- L135 T1 DA-15
- L136 E1 RJ-45
- L137 E1 DA-15
- L138 EIA-422 DC-37 without controls
- L139 T88

In addition, this chapter describes operating and clock modes for the ELIMs.

3.1 L130: Configurable EIA-232/423/530/P53/449/V35

The L130 ELIM is electrically compatible with the EIA-423A, EIA-232D, and EIA-530 standards. Table 2 lists the EIA-423/232 and EIA-530 signals with the pinouts for the female DB-25 connector and the signals and pinouts for the adapters that support EIA 449/422 or V.35.

The control leads comply with the interface standards. RTS, CTS and DCD provide handshaking. TD and RD are data input and output. SCT is the clock output for Internal and Slave modes. SCR is always the clock for RD. SCTE is the clock input for External mode. DSR, DCD, and CTS output are selectable in software.

The EIA-423 and EIA-232 interface includes these five end-to-end control leads:

- RTS to DCD
- DTR to RI
- STD to SRD
- SRTS to SDCD
- DSRS to SCTS

DSR and TM are local status leads that follow the functions described in EIA-232D. DSR typically indicates that the modem is ready to handle transmit data. TM indicates that a loopback is active on one or both modems. LL and RL are loopback control inputs and follow the software setting, unless a 2370 in a Model 1040 is in hardware mode and the function switch on the enclosure is set for loopback, then LL and RL are ignored. For details on the software and loopback tests, see Sections 4.12 and 5.1.

The V.35 interface signals follow the EIA-423 and EIA-232 protocols with minor changes, including these three end-to-end control leads:

- RTS to DCD
- DTR to RI

DSR indicates that the modem is ready to receive data. TM is On only when loopback is active on either or both modems.

Table 2. Signals and Pinouts: EIA-423/232, -530 Protocols and EIA-449/42 and V.35 Adapters

Signal Name	Path	EIA-423/232 Signal	DB-25 Pin	EIA-530 Signal	DB-25 Pin	EIA-449/422 Signal	DC-37 Pin	CCITT Circuit	V.35 Pin
Frame Ground		FG	1	FG	1	SHLD	1	101	A
Transmit Data	In	TD	2	TDA	2	SD	4	103	P
Receive Data	Out	RD	3	RDA	3	RD	6	104	R
Request to Send	In	RTS	4	RTSA	4	RS	7	105	C
Clear to Send	Out	CTS	5	CTSA	5	CS	9	106	D
Data Set Ready	Out	DSR	6	DSRA/B	6/22	DM	11	107	E
Signal Ground		SG	7	SG	7	SG	19	102	B
Data Carrier Detect	Out	DCD	8	DCDA	8	RR	13	109	F
Secondary RC	Out			RXCB	9	RT	26	115	V
Secondary DCD	Out			DCDB	10	RR	31		
Secondary TT	In			SCTEB	11	TT	35	113	U
Secondary DCD	Out	SDCD	12	TXCB	12	ST	23	114	Y
Secondary CTS	Out	SCTS	13	CTSB	13	CS	27		
Secondary TD	In	STD	14	TDB	14	SD	22	103	S
Transmit Clock	Out	SCT	15	TXCA	15	ST	5	114	AA
Secondary RD	Out	SRD	16	RDB	16	RD	24	104	T
Receive Clock	Out	SCR	17	RXCA	17	RT	8	115	X
Local Loopback	In	LL	18	LLA	18	LL	10	141	L
Secondary RTS	In	SRTS	19	RTSB	19	RS	25		
Data Terminal Ready	In	DTR	20	DTRA/B	23/20	TR	12	108	H
Remote Loopback	In	RL	21	RLA	21	RL	14	140	N
Ring Indicator	Out	RI	22			DM	29	125	J
Data Signal Rate Selector	In	DSRS	23			TR	30		
Terminal Timing	In	SCTE	24	SCTEA	24	TT	17	113	W
Test Mode	Out	TMA	25	TMA	25	TM	18	142	NN

3.2 P53 Interface for the L130

The L130 ELIM supports the P53 interface and external DCE/DTE adapter that converts the interface to DTE with male DB-25 connector This interface supports FIFO buffers for received or transmitted data and a programmable delay line to fine-tune the clock and data timing. The interface supports these typical applications:

- With encryption devices on the BLACK side, where modems act as the network and supply the synchronous clock, or on the RED (clear) side of data encryption (KG) equipment as the "tail-circuit adapter" device. This allows the modem to accept two synchronous clocks, one for transmitting (external clock) and one for receiving (FIFO input clock, SCT becomes an input).
- With systems that communicate over geosynchronous satellites, the FIFO can make up for clock drift (Doppler shift) caused by the satellite's elliptical orbit around the earth.

Use the External Station configuration when an external station (slave) clock provides the timing (see Figure 2). In this application, the modems act as the network, although the timing is from an outside source. When connecting KG or KIV encryptors on the Black side with an external timing device, go to the Functional Configuration screen and set the interface configuration values: set the modem with the timing source to external; set the other modem to slave; for details, see Section 4.7.

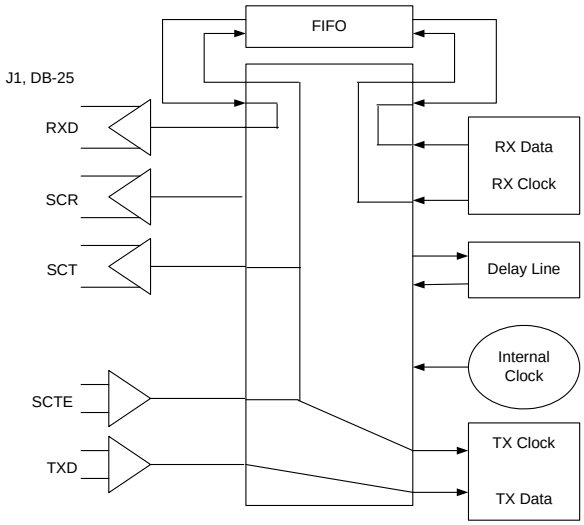

Figure 2. P53 Interface for External Station Clock

Use the Internal configuration when the network equipment is set for Internal Timing (see Figure 3). In this application, the modems act as the network timing source. When connecting KG or KIV encryptors on the Black side, go to the Functional Configuration screen and set the interface configuration parameters: set the operating mode to Internal, then set the Internal Rate, then set the delay time; for details, see Section 4.7.

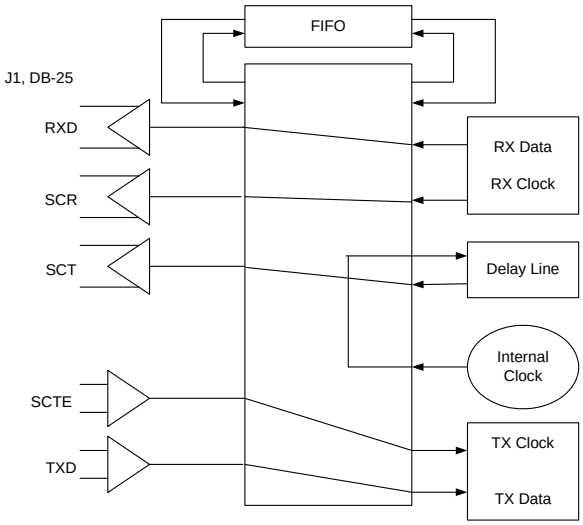

Figure 3. P53 Interface for Internal Clock

Use the External configuration when the network equipment is set for Network or Internal Timing (see Figure 4). In this application, the modems act as an extension of the Red side cable in a true tail circuit. When connecting KG or KIV encryptors on the Red side to a DTE device, go to the Functional Configuration screen and set the interface configuration parameters: set the operating mode for the modem at the Red end to External and the modem at the DTE end to Slave; for details, see Section 4.7.

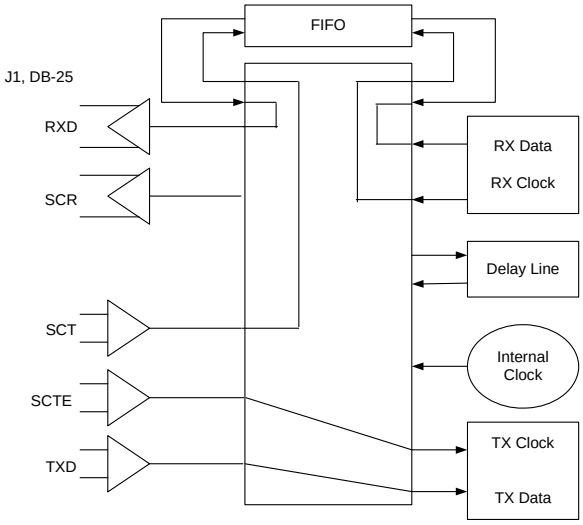

Figure 4. P53 Interface for External Function

3.3 L131: EIA-422, DC-37 With Control Signals

The L131 ELIM for EIA-449 is electrically compatible with the EIA-422 specifications for clock and data and with EIA-423 for control signals. It uses a female DC-37 connector; Table 3 lists the pinout.

SD, RD, ST, RT and TT provide the primary data and clock signals. ST provides the transmit clock reference for Internal and Slave modes. RT provides the clock for the received data. TT provides the transmit clock for External mode.

The control signal outputs are unbalanced drivers and the B-leads of the differential control signal outputs are tied to signal ground to comply with EIA-422. None of the control leads interact with the data transmission, but they do comply with DTE interface requirements. Most of the control leads are end-to-end signal channels that can conform to EIA-449 interface standards..

The EIA-449 interface includes three end-to-end control leads; input to output:

- RS to RR
- TR to IC
- NS to SQ

DM and TM provide local status and follow the RS-449 functions. DM typically indicates that the modem is ready to receive data. LL and RL are loopback control inputs and follow the software setting, unless a 2370 in a Model 1040 is in hardware mode and the function switch on the enclosure is set for loopback, then LL and RL are ignored. For details on the software and loopback tests, see Sections 4.12 and 5.1.

Table 3. EIA-449 Interface DC-37 Pin Assignments

DC-37 Pin	EIA-449 Signal	Function	Direction
1	SHLD	Shield (Ground)	
3/21	not used		
4/22	SD	Send Data	In
5/23	ST	Send Timing	Out
6/24	RD	Receive Data	Out
7/25	RS	Request to Send	In
8/26	RT	Receive Timing	Out
9/27	CS	Clear to Send	Out
10	LL	Local Loopback	In
11/29	DM	Data Mode	Out
12/30	TR	Terminal Ready	In
13/31	RR	Receiver Ready	Out
14	RL	Remote Loopback	In
15	IC	Incoming Call	Control
17/35	TT	Terminal Timing	In

DC-37 Pin	EIA-449 Signal	Function	Direction
18	TM	Test Mode	Out
19	SG	Signal Ground	
20	RC	Receive Common	
33	SQ	Signal Quality	Control
34	NS	New Signal	Control
37	SC	Send Common	

3.4 L132: EIA-422, TwinAx

The L132 ELIM is electrically compatible with the EIA-422A specifications. It uses five TwinAx connectors. Table 4 lists the supported signals.

Table 4. EIA-422 Interface TwinAx Signals

Signal	Name	Direction
RXD	Receive Data	Out
TXD	Transmit Data	In
SCR	Receive Clock	Out
SCT	Transmit Clock	Out
SCTE	External Transmit Clock	In

3.5 L133: TTL, BNC

The L133 ELIM includes five BNC connectors to connect to a DTE device that uses unbalanced TTL signal levels; it supports only the clock and data. Use this ELIM for high speeds and long distances. Table 5 lists the supported signals.

Table 5. TTL/BNC Signals

Signal	Name	Direction
RXD	Receive Data	Out
TXD	Transmit Data	In
SCR	Receive Clock	Out
SCT	Transmit Clock	Out
SCTE	External Transmit Clock	In

3.6 L134, L135, L136, L137: T1 and E1

The L134, L135, L136, and L137 ELIMs are electrically compatible with T1 or E1 specifications. Tables 6 and 7 show the connector pinouts.

- L134 supports T1 and transmits AMI or B8ZS code. The ELIM includes an RJ-45 connector; use a 100 ohm twisted pair cable to connect to the local network equipment.
- L135 supports T1 and transmits AMI or B8ZS code. The ELIM includes a DA-15 connector; use a 100 ohm twisted pair cable to connect to the local network equipment.
- L136 supports E1 and transmits AMI or HDB3 code. The ELIM includes an RJ-45 connector; use a 120 ohm twisted pair cable to connect to the local network equipment.
- L137 supports E1 and transmits AMI or HDB3 code. The ELIM includes a DA-15 connector; use a 120 ohm twisted pair cable to connect to the local network equipment.

These ELIMs include two LEDs, LOS and AIS. See Table 8.

Table 6. RJ-48 Pinout

Pin	Direction
1, 2	Tx (Output)
4, 5	Rx (Input)

Table 7. DA-15 Pinout

Pin	Direction
1, 9	Rx (Input)
3, 11	Tx (Output)

Table 8. T1 and E1 ELIM Status LEDs

LED	Color	Description
LOS	Off	Normal
	Red	Loss of received signal
AIS	Off	Normal
	Amber	Alarm; receiving all 1s

3.7 L138: EIA-422, DC-37 Without Control Signals

The L138 ELIM is electrically compatible with the EIA-422A specifications. It includes a female DC-37 connector, but not the control signals available with the EIA-449 interface. Table 9 lists the supported clock and data signals.

Table 9. EIA-422, Without Control Signals, DC-37 Pin Assignments

Pin	Signal	Name	Direction
15/33	RDA/B	Receive Data	Out
17/35	SCRA/B	Receive Clock	Out
9/27	TDA/B	Transmit Data	In
5/23	SCTEA/B	Terminal Timing	In
3/21	SCTA/B	Transmit Clock	Out
19	FG	Frame Ground	
1	SG	Signal Ground	

3.8 L139: T88

The L139 ELIM is electrically compatible with Mil-Std 188-114C; it supports only the clock and data. It includes five TwinAx connectors. Table 10 lists the supported signals.

Table 10. EIA-422 Interface TwinAx Signals

Signal	Signal Name	Direction
SCR	Receive Clock	Out
RXD	Receive Data	Out
TXD	Transmitted Data	In
SCTE	External Transmit Clock	In
SCT	Transmit Clock	Out

3.9 Operating Modes and Transmit/Receive Timing

The 2370 operates in a variety of modes that support different sources of the timing signals; you can set these on the Functional Configuration screen. For details on the Functional Configuration screen and configuring the parameters for various interfaces, see Section 4.7.

The TD Timing signal is the clock that sends data to the fiber interface. It can be either the SCT or SCTE signals. Use SCT Inverted to allow for data delays in relation to the clock and prevent bit errors. Use SCTE Sampled if the clock is gapped.

The RD Timing signal is the clock that shifts data to the electrical interface. It can be either the SCT or SCR signals.

- External mode: Use when the DTE provides the clock or when the 2370 is used as a tail circuit connecting to a DCE. The other device sends this clock to the modem as the TD Timing signal. Go to the Functional Configuration screen and set the interface configuration values: select External mode, then set the TD Timing source to SCTE or SCTE Sampled for a gapped clock. See Figure 5.

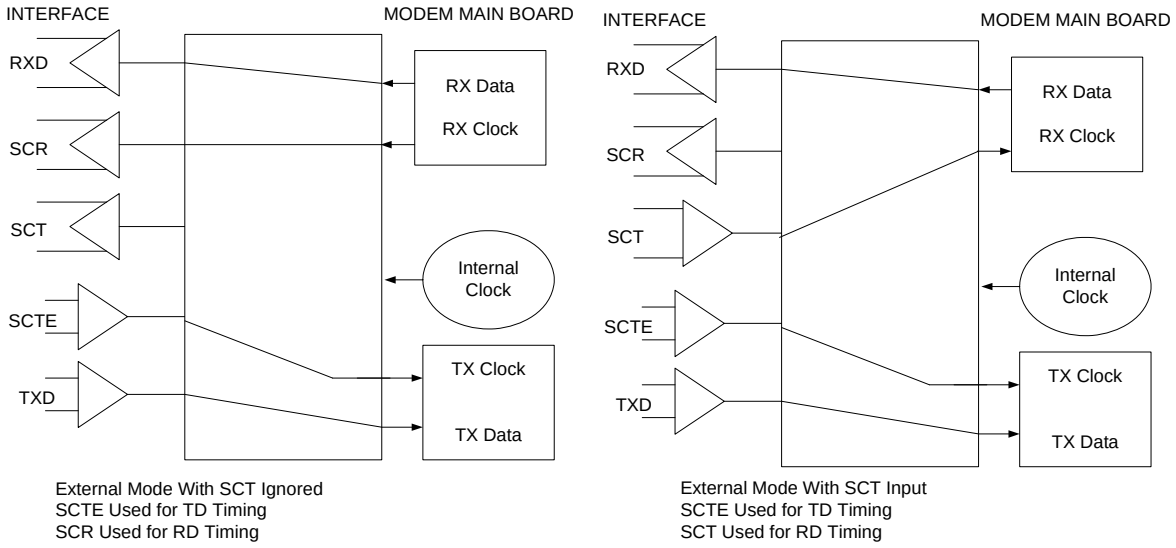

Figure 5. External Operating Mode

- Internal mode: Use when this 2370 generates the clock and sends it to the DTE on the SCT signal. Go to the Functional Configuration screen and set the interface configuration values: set the interface type, then select Internal mode, then set the Internal data Rate; then set the TD Timing source to SCT for most applications or to SCTE or SCT Inverted for high data rates or a long cable to the DTE. See Figure 6.

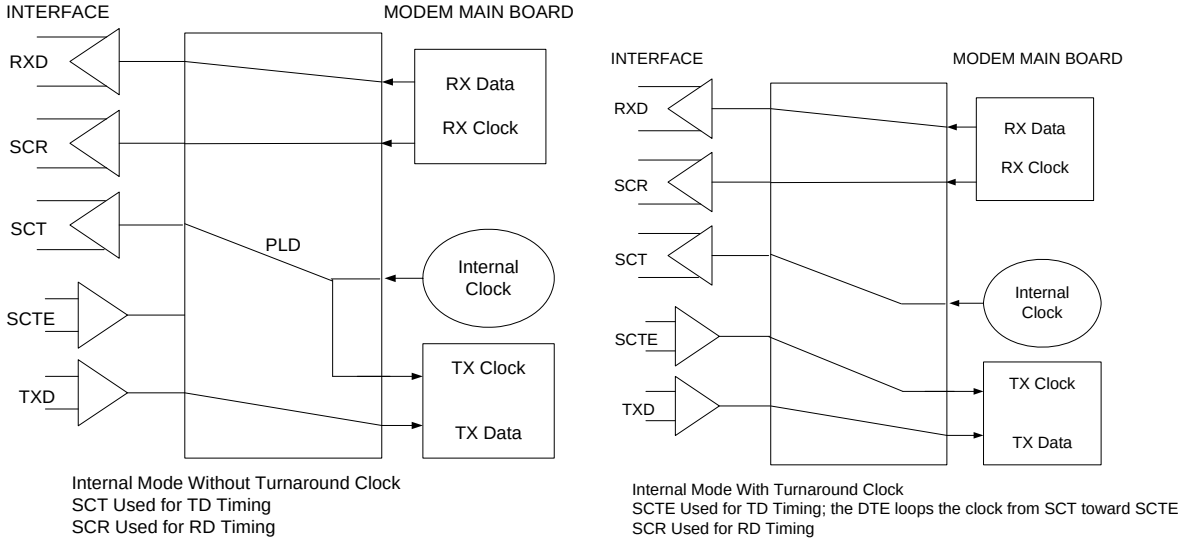

Figure 6. Internal Operating Mode

- Slave mode: This 2370 uses the clock from the remote modem as both the TD Timing and RD Timing signals. Go to the Functional Configuration screen and set the interface configuration values: set the interface type, then select Slave mode, then set the TD Timing source to SCT for most applications or to SCTE, SCTE Sampled, or SCT Inverted for high data rates or a long cable to the DTE. See Figure 7.

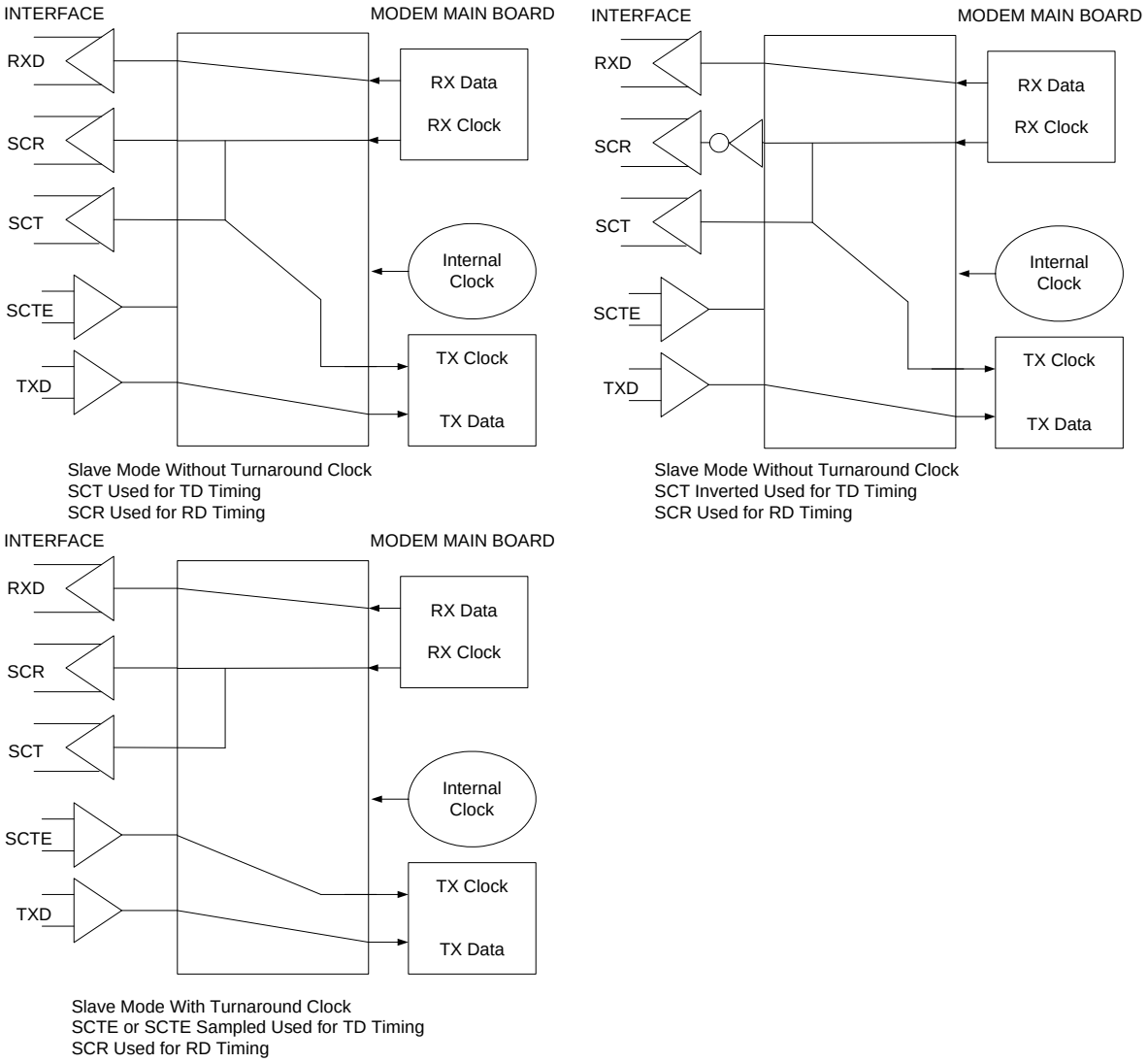

Figure 7. Slave Operating Mode

- Asynchronous mode: Use when a data signal is present without a separate clock signal. This mode samples the data signal at 100 MHz, causing a 10 ns pulse distortion, which can affect high data transmission rates.

For details on the Functional Configuration screen and configuring the parameters for various interfaces, see Section 4.7.

Chapter 4
Software Management

If the 2370 is in a Model 1040 enclosure or is in a UCS 1000 chassis within a system that includes a DMM and a CIM, you can manage the 2340 through VT100 Terminal Emulation, which is accessible by a Telnet session, HyperTerminal or similar terminal emulation software, a standard SNMP network manager, and CanogaView.

4.1 VT100 Terminal Emulation

Connect the VT100 terminal emulation session to the DMM used in the UCS 1000 chassis or directly to a Model 1040 enclosure.

For details on the DMM, see the *Model 1500 Domain Management Module User Manual*.

Setting up the VT100 session depends on which connection, serial port or Ethernet, you have available for access to the VT100 management program. Canoga Perkins suggests that you use HyperTerminal for your first session. For details, see the User Manual for your DMM.

Note: You must set up TCP/IP for the DMM before you can use Telnet; for details, see the manual for the DMM.

4.2 PC Configuration for Terminal Operation

These steps briefly describe how to set up your PC for a terminal connection to a Model 1040 enclosure. For details on using Windows, see your Windows documentation.

1. Turn on your PC.
2. When the Windows desktop appears, click Start, then highlight Programs, Accessories, the HyperTerminal Folder, and then click HyperTerminal.
3. At the Connection Description dialog, select an icon, enter a name for the connection to the system, and click OK.
4. At the Connect To dialog, pull down the Connect using menu, select the COM port, and click OK.
5. At the COM Properties dialog, on the Port Settings tab, check for these selections:
   - Bits per second: 19200 bps
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: None
6. Click OK. HyperTerminal connects to the system and the VT100 terminal emulation starts.

4.3 Management User Interface

The Management User Interface for the 2370 provides screens for setup, monitoring, and diagnostics. You can access the screens directly by connecting to the serial port of the DMM in the chassis or by establishing a Telnet session with the DMM. These sections discuss the screens for the 2370, using a Telnet session for access; for details about the DMM screens, see the User Manual for your DMM.

4.3.1 General Screen Format

A typical screen, shown in Figure 8, includes standard descriptions and reference designations. Use this and other screens to configure the system, set operational parameters, and verify the system status. All screens use a common method for navigation.

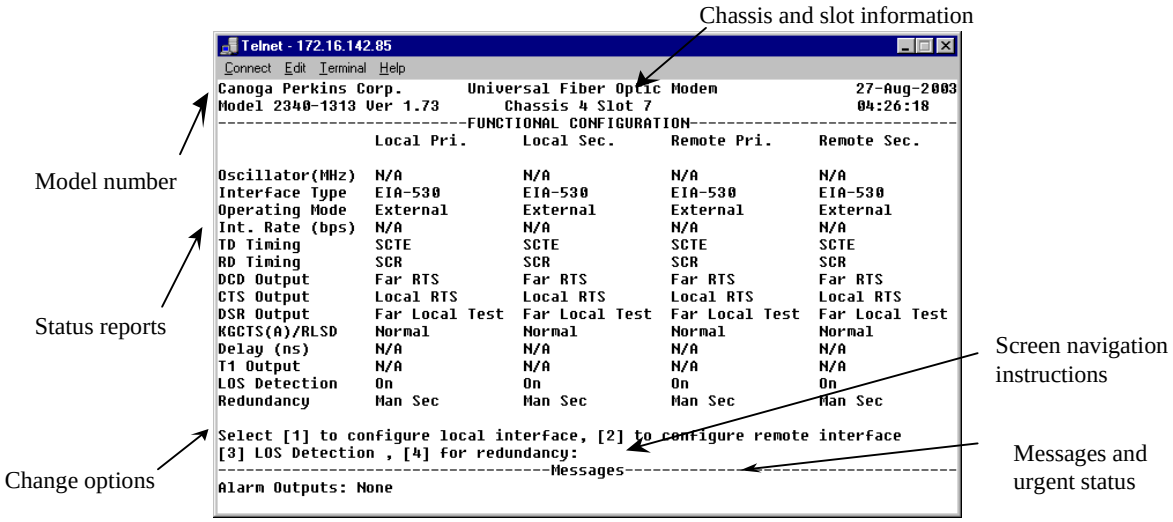
Chassis and slot information
Telnet - 172.16.142.85
Connect Edit Terminal Help
Canoga Perkins Corp. Universal Fiber Optic Modem 27-Aug-2003
Model 2340-1313 Ver 1.73 Chassis 4 Slot 7 04:26:18
FUNCTIONAL CONFIGURATION
Local Pri. Local Sec. Remote Pri. Remote Sec.
Oscillator(MHz) N/A N/A N/A N/A
Interface Type EIA-530 EIA-530 EIA-530 EIA-530
Operating Mode External External External External
Int. Rate (bps) N/A N/A N/A N/A
TD Timing SCTE SCTE SCTE SCTE
RD Timing SCR SCR SCR SCR
DCD Output Far RTS Far RTS Far RTS Far RTS
CTS Output Local RTS Local RTS Local RTS Local RTS
DSR Output Far Local Test Far Local Test Far Local Test Far Local Test
KGCTS(A)/RLSD Normal Normal Normal Normal
Delay (ns) N/A N/A N/A N/A
T1 Output N/A N/A N/A N/A
LOS Detection On On On On
Redundancy Man Sec Man Sec Man Sec Man Sec
Select [1] to configure local interface, [2] to configure remote interface
[3] LOS Detection , [4] for redundancy:
Messages
Alarm Outputs: None
Model number
Status reports
Change options
Screen navigation instructions
Messages and urgent status

Figure 8. General Screen Format

Not all screens and menus provide options that you can change. Some menu items reach screens that only report status, such as revision numbers, module type, or alarms. On other screens, you can move through and select options, and enter data.

Use these keys to navigate the screens:

- Space bar When a menu item is highlighted, press <Space> to cycle through all options for that item.
- Tab Press <Tab> to move the highlight to the next column to the right.
- Enter Press <Enter> to select the highlighted option for a menu item.
- Escape Press <Esc> to return to the previous screen.

4.3.2 User Interface Organization

The user interface consists of selectable, nested screens, available in this order:

Main Menu

1. System Configuration
    1. Hardware Configuration
    2. Functional Configuration
        1. Configure local interface
        2. Configure remote interface
        3. LOS Detection
        4. Redundancy setup
    3. Trap Configuration
    4. Alarm Output Configuration
    5. SNMP Configuration Parameters
        13. Host Table
2. Diagnostics
3. Interface Status
4. Link Counter Errors
5. System Alarms
6. Utilities
7. Software Upgrade

This chapter describes each of these screen in detail.

4.3.3 Login Screen and DMM Main Menu

The first screen is the Login Menu. If this is your initial setup and no password has been set, type `admin`, then press <Enter>, at the prompts for both the user name and the password. Otherwise, type your password and press <Enter>.

After you log in, the Main Menu for the DMM appears. This is the main management screen for the DMM. For details on all menu options, see the *Model 1500 Domain Management Module User Manual*. From this screen, you can access the 2370 by either of two methods.

- To reach the 2370 directly, follow these steps:
    a. Type `4`, "Manage or access a specific Module," and press <Enter>.
    b. Type the chassis and slot numbers with a slash, such as "`1/4`" for chassis 1, slot 4, and then press <Enter>.
    c. At the Module Menu, type `4`, "Access User Interface," then press <Enter> to reach the Main Menu screen for the 2370.

- To reach the chassis, and then select the 2370, follow these steps:

  a. Type `3`, "Manage or access a specific Chassis," and press <Enter>, press <Space> to cycle through the chassis in the domain, and then press <Enter> to select the chassis.

  b. At the Chassis Management screen, press <Space> to cycle to the slot number for the 2370, then press <Enter> to reach the Main Menu screen for the 2370.

4.4 2370 Main Menu

The Main Menu provides access through various menus and reports to all functions for the 2370, setup, diagnostics, and reports. See Figure 9.

```
          MAIN MENU
1) System Configuration
2) Diagnostics
3) Interface Status
4) Link Error Counters
5) System Alarms
6) Utilities
7) Software Upgrade
8) Logout
```

Figure 9. 2370 Main Menu

4.5 System Configuration

The System Configuration menu provides configuration options. See Figure 10 and Table 11. To access the System Configuration menu, follow this step:

1. At the Main Menu, type `1`, "System Configuration," and press <Enter>. The System Configuration screen appears.

```
 SYSTEM CONFIGURATION

1) Hardware Configuration
2) Functional Configuration
3) Trap Configuration
4) Alarm Output Configuration
5) SNMP Configuration
```

Figure 10. System Configuration Menu

Table 11. System Configuration Option Definitions

Menu Item	Description
1) Hardware Configuration	Reports information about the local and remote modems
2) Functional Configuration	Reports modem status; set ELIM values and loopback options
3) Trap Configuration	Enable or disable traps
4) Alarm Output Configuration	Enable or disable the alarm outputs; set alarm levels
5) SNMP Configuration	Reports Ethernet information; set up SNMP parameters

4.6 Hardware Configuration

The Hardware Configuration screen reports information about the local and remote primary and secondary modems. See Figure 11. To view the Hardware Configuration report, follow these steps:

1. At the System Configuration menu type 1, "Hardware Configuration," and press <Enter>. The Hardware Configuration screen appears.
2. To return to the System Configuration menu, press <Esc>.

```
-------------------------HARDWARE CONFIGURATION-----------------------

                 Local                          Remote
                 Pri.            Sec.           Pri.            Sec.

Chassis/Slot     5/8             Standalone     Standalone      Standalone
Chassis Type     5U UCS 1000     1040           1040            1040
Power Supply Pri AC 120/240      AC 120/240     AC 120/240      AC 120/240
Power Supply Sec N/A             N/A            N/A             N/A
Fan Installed    N/A             N/A            N/A             N/A
Modem Model      2370-1313       2370-1313      2370-1313       2370-1313
Modem Type       1310 MM SC 10dB 1310 MM SC 10dB 1310 MM SC 10dB 1310 MM SC 10dB
Modem Revision   A1              A1             A1              A1
Modem Serial No. 20030694501     20021019450    20021945010     20021014945
ELIM Model       L130            L130           L130            L130
ELIM Type        Configurable    Configurable   Configurable    Configurable
ELIM Revision    A1              A1             A1              A1
ELIM Serial No.  20030592525     20021925255    20021039252     20029252503
```

Figure 11. Hardware Configuration Screen

4.7 Functional Configuration

The Functional Configuration report and menu provides information about the local and remote interfaces, LOS detection, and redundancy, with options to set all values. See Figure 12 and Table 12. The Oscillator (MHz) parameter shows the frequency of the optical oscillator, or shows N/A if no oscillator is installed. Some parameters are valid for only certain interfaces and settings and show N/A in all conditions that do not apply. For information about the various electrical interfaces and the operating modes, see Chapter 3.

```
------------------------FUNCTIONAL CONFIGURATION------------------------
                Local Pri.     Local Sec.      Remote Pri.   Remote Sec.

Oscillator(MHz) 6.144          6.144           6.144         6.144
Interface Type  EIA-423/232    EIA-423/232     EIA-530       EIA-530
Operating Mode  Internal       Internal        Slave         Slave
Int. Rate (bps) 384000         384000          384000        384000
TD Timing       SCTE           SCTE            N/A           N/A
RD Timing       SCR            SCR             SCT           SCT
DCD Output      Far RTS        Far RTS         CLS           CLS
CTS Output      Local RTS      Local RTS       Remote DTR    Remote DTR
DSR Output      Far Local Test Far Local Test  Any Test On   Any Test On
KGCTS(A)/RLSD   Normal         Normal          +6V/GND       +6V/GND
Delay (ns)      N/A            N/A             N/A           N/A
T1 Output       N/A            N/A             N/A           N/A
LOS Detection   On             On              On            On
Redundancy      Auto/Active    Auto/Inactive   Auto/Active   Auto/Inactive

Select [1] to configure local interface, [2] to configure remote interface,
[3] LOS Detection, [4] redundancy setup:
```

Figure 12. Functional Configuration Screen

Table 12. Functional Configuration Option Definitions

Menu Item	Description
1) Configure local interface	Enter values for the local interface parameters
2) Configure remote interface	Enter values for the remote interface parameters
3) LOS Detection	Set to On or Off
4) Redundancy setup	Set to Auto, Manual Primary (Man Pri) or Secondary (Man Sec), or Off; shows current activity

You can set values for various parameters for both local and remote modems. To configure an interface, see Tables 12 and 13 and follow these steps: To configure the 2370 functions, follow these steps:

1. From the Main Menu type 2, "Functional Configuration," and press <Enter>.
2. From the Functional Configuration menu type `1`, "to configure local interface," or `2`, "to configure remote interface," and press <Enter>.
3. At each successive prompt, press <Space> to cycle through the options and press <Enter> to select an option or type a number to select values for the parameters, according to the information in Table 13.
4. To set up LOS Detection or Redundancy, type `3` or `4` and follow the prompts on the screen.

Note: LOS detection differs by application. For a 530 or 422 (with controls) interface, LOS uses RTS. For a T22, D22, and T88 interface, LOS uses SCTE. For T1/E1, LOS tracks 175 consecutive zeros. TTL/BNC interfaces do not support LOS.

5. To return to the System Configuration menu, press <Esc>.

Note: When setting the Internal Rate parameter, the 2370 may not be able to generate the exact rate. To calculate the available rates, use this equation:

`Rate = Osc (PLL_N/PLL_M) (1/Div)`

Where
Ocs = 16384000 Hz, 24704000 Hz, or custom oscillator rate
32 ≤ PLL_N ≤ 254
64 ≤ PLL_M ≤ 128
2 ≤ Div ≤ 65354
and PLL_N, PLL_M, and Div are even numbers

Table 13. Interface Configuration Parameters and Values

ELIM Group	Parameter	Possible Values
L130 EIA-423/232, EIA-530, EIA-449/422, or V.35	Interface Type	EIA/423/232, EIA-530, EIA-449/422, or V.35
	Operating Mode	Internal, Slave, External, or Asynchronous
	Internal Rate (bps) (select for Internal Mode)	Type the rate, then confirm the rate calculated from the Rate equation above
	TD Timing, the clock that sends data to the fiber interface (select for Internal, Slave, or External Modes)	Internal Mode: SCTE, SCT, or SCT Inverted Slave Mode: SCTE, SCTE Sampled, SCT, or SCT Inverted External Mode: SCTE or SCTE sampled
	RD Timing, the clock that shifts data to the electrical interface (select for External Mode)	SCT or SCR
	DCD Output	Remote RTS or CLS (DCD False if CLS is True)
	KG CTS(A) (select for EIA-530)	Normal, +6V/GND, +6V/-6V, GND/-6V, GND/+6V, -6V/+6V, or -6V/GND
	CTS Output (select for EIA-423/232, EIA-449/442, or V.35, and KG CTS(A) set to Normal)	Local RTS, Local RTS & DCD, or Remote DTR/RI/IC
	DSR Off When	Far Local Test or Any Test On

ELIM Group	Parameter	Possible Values
L130 with P53	Interface Type	P53
	Operating Mode	Internal, Ext. Station, or External
	Internal Rate (bps) (select for Internal Mode)	Type the rate, then confirm the rate calculated from the Rate equation above
	Delay (ns) (select for Internal Rate)	0 to 170 in 10 ns increments
	TD Timing (select for Ext. Station or External Modes)	SCTE or SCTE Sampled
	DCD Output (select for External Mode)	Remote RTS or CLS (DCDFalse if CLS is True)
	RLSD (select for External Mode)	Normal, +6V/GND, +6V/-6V, GND/-6V, GND/+6V, -6V/+6V, or -6V/GND
	DSR Off When (select for External Mode)	Far Local Test or Any Test On
L131, L132, and L138 TwinAx 422 or DC-37 High Speed EIA-422	All values preset	
L133 TTL/BNC	Operating Mode	Internal, Slave, External, or Asynchronous
	Internal Rate (bps) (select for Internal Mode)	Type the rate, then confirm the rate calculated from the Rate equation above
	TD Timing (select for Internal, Slave, or External Modes)	Internal Mode: SCTE, SCT, or SCT Inverted Slave Mode: SCTE, SCTE Sampled, SCT, or SCT Inverted External Mode: SCTE or SCTE sampled
	RD Timing (select for External Mode)	SCT or SCR
L134, L135, L136, and L137 Transparent T1/E1	E1: All values preset T1: Set only T1 Output	0-133FT, 133-266FT, 266-399FT, 399-533FT, 533-655FT, CSU part 68 opt. A, or CSU T1C1.2

4.8 Trap Configuration

Traps are messages that require management attention and are routed to the Network Manager, but do not trigger alarms. Use the Trap Configuration screen to view the current configuration and to enable or disable traps for the 2370. See Figure 13 and Table 14. To configure traps, follow these steps:

1. From the System Configuration menu type 3, "Trap Configuration," and press <Enter>.

2. At the Trap Configuration screen, type the number for a trap and press <Enter>.

Note: "Master Trap Control" enables or disables all traps; the default is Disabled.

2. Press <Space> to cycle to Enabled or Disabled and press <Enter>.

3. To return to the System Configuration menu, press <Esc>.

```
-----------------------TRAP CONFIGURATION-------------------------------


 1) Master Trap Control                        Disabled

 2) LOS/CLS Traps                              Enabled
 3) SQL Traps                                  Enabled
 4) Redundancy Traps                           Enabled
 5) Configuration Traps                        Enabled
 6) Diagnostic Traps                           Enabled
 7) Authentication Traps                       Enabled
 8) Power/Fan Malfunction Traps                Enabled
 9) Cold Start Traps                           Enabled
10) Alarm Input Traps                          Enabled
11) Security Violation Traps                   Enabled
```

Figure 13. Trap Configuration Screen

Table 14. Trap Definitions

Type of Trap	Definition
2) LOS/CLS	Loss of Signal (electrical)/Composite Loss of Signal (optical); one or both received signals fail
3) SQL	Squelch (for received signal)
4) Redundancy	Monitors redundant operation activity
5) Configuration	Setup errors, including mismatches with other modems
6) Diagnostic	Monitors loopback
7) Authentication	Checks for SNMP access and read/write community string
8) Power/Fan Malfunction	Power is low or fan is off
9) Cold Start	Monitors the reset function
10) Alarm Input	UCS 1001 function; see the UCS 1001 User Manual
11) Security Violation	Not used

4.9 Alarm Output Configuration

Use the Alarm Output Configuration screen to set any or all alarms to Major, Minor, or Off. See Figure 14 and Table 15.

To configure alarms, follow these steps:

1. From the System Configuration menu type 4, "Alarm Output Configuration," and press <Enter>. The Alarm Output Configuration screen appears.
2. Type the number for the alarm you want to set and press <Enter>.
3. Press <Space> to cycle to Major, Minor, or Off, and press <Enter>.
4. To return to the System Configuration menu, press <Esc>.

```
------------------ALARM OUTPUT CONFIGURATION--------------------------


1) Factory Defaults

2) LOS/CLS Alarm                                Off
3) SQL Alarm                                    Off
4) Configuration Alarm                          Off
5) Power/Fan Alarm                              Minor
6) Power-On Self Test Alarm                     Major
7) BERT Alarm                                   Minor
```

Figure 14. Alarm Output Configuration Screen

Table 15. Alarm Output Definitions

Alarm	Description
1) Factory Defaults	Reset all alarms to factory defaults, for values, see Figure 14
2) LOS/CLS	Loss of Signal (electrical)/Composite Loss of Signal (optical); one or both received signals fail; default is Off
3) SQL	Squelch (for received signal); default is Off
4) Configuration	Setup errors, including mismatches with other modems; default is Off
5) Power/Fan	Power is low or fan is off; default is Minor
6) Power-On Self Test	Modem failed when power was turned on; default is Major
7) BERT	Bit Error Rate Test (BERT) detects data errors; default is Off

4.10 SNMP Configuration

Use the SNMP Configuration screen to view and set up the SNMP parameters on the 2370. See Figure 15 and Table 16. To view SNMP parameters, follow these steps:

1. From the System Configuration menu type 5, "SNMP Configuration," and press <Enter>. The SNMP Configuration screen appears.
2. Type the number for the alarm you want to set and press <Enter>.
3. Type the information or value, and press <Enter>.
4. To return to the System Configuration menu, press <Esc>.

```
--------------------------SNMP CONFIGURATION-----------------------------
    Ethernet Address         00 40 2A 00 53 E7
    Ethernet Link            UP/Half Duplex

1)  System Contact
2)  System Name
3)  System Location
4)  Read Community           public
5)  Write Community          public
6)  SLIP/PPP IP Address      0.0.0.0
7)  Ethernet IP Address      172.16.143.10
8)  Subnet Mask              255.255.0.0
9)  Default Gateway          172.16.1.1
10) BOOTP Enabled            No
11) Serial Port Config       VT100
12) Telnet Timeout           Never
13) Host Table
```

Figure 15. SNMP Configuration Screen

Table 16. SNMP Configuration Parameters Description

Item	Description
1) System Contact	Who is responsible for the 2370, up to 50 characters
2) System Name	What you call the 2370, up to 50 characters
3) System Location	Where the 2370 is located, up to 50 characters
4) Read Community	Name for the people who can view the reports, up to 10 characters; default is public
5) Write Community	Name for the people who can set values for parameters, up to 10 characters; default is public
6) SLIP/PPP IP Address	Enter the IP address for access through SLIP or PPP
7) Ethernet IP Address	Enter the IP address for access through the Ethernet network
8) Subnet Mask	Enter the mask that sets the network ID part of the IP address
9) Default Gateway	Enter the address of the network node that connects to another network

Item	Description
10) BOOTP Enabled	Enable this if the module needs to obtain its IP address from a BOOTP server; when the unit has an IP address, disable BOOTP
11) Serial Port Config	Set the type of serial port connection: VT100, SLIP, or PPP
12) Telnet Timeout	Set the time with no activity until a Telnet connection automatically logs out
13) Host Table	Go to the Host Table screen

4.11 Host Table

The SNMP agent allows access to up to 24 Host IP addresses listed in the Host Table. Set up the Host information for the 2370 on the Host Table screen. See Figure 16. To access the Host Table, follow these steps:

1. From the SNMP Configuration menu, type `13`, Host Table, and press <Enter>. The Host Table screen appears.
2. To add a host, type `1` and press <Enter>, then follow the prompts, to enter values for these parameters:
   a. IP Address for the Host
   b. Access level for the host; can be `1`, read; `2`, read/write; `3`, read/trap; or `4`, read/write/trap
   c. Trap community string (up to 10 characters)
3. To delete a host, type `2` and press <Enter>, then at the prompt, enter IP Address for the Host.
4. Type `Y` to confirm your changes and save them. The host table appears again with your changes.
5. To return to the SNMP Configuration menu, press <Esc>.

```
-------------------------------HOST TABLE-------------------------------
Managing      Access    Trap    Trap  Managing      Access    Trap    Trap
  Host        Level   Community Port    Host        Level   Community Port
-----------------------------------  -----------------------------------
172.16.142.20   4     public     162

  Add or Delete a host entry (1=Add, 2=Delete from table):
```

Figure 16. Host Table Screen

4.12 Diagnostics

Use the Diagnostics screen to view current loopback status and set loopback controls. See Figure 17 and Table 17. To access the Diagnostics screen, follow these steps:

1. From the Main Menu type 2, "Diagnostics," and press <Enter>.
2. Type the number for the control that you want to set and press <Enter>.
3. Press <Space> to cycle to the setting you want, and press <Enter>.
4. To return to the Main Menu, press <Esc>.

```
------------------------------DIAGNOSTICS--------------------------------

                            Local       Local         Remote      Remote
                            Pri.        Sec.          Pri.        Sec.


Loopback Switch Status      N/A         N/A           N/A         N/A
Interface LL Signal         Off         Off           Off         Off
Interface RL Signal         Off         Off           Off         Off


1) Loopback                 Norm        Norm          Norm        Norm
2) Loopback Control Mode    Software    Software      Software    Software
3) Electrical Line Relay    Open        Closed        Open        Closed
```

Figure 17. Diagnostics Screen

Table 17. Diagnostics Screen Definitions

Item	Description
Loopback Switch Status	If the 2370 is in a 1040 enclosure, shows current position of the switch on the 1040 as Normal, Local (F1), or Remote (F2); otherwise, shows N/A.
Interface LL Signal	For an L130 or L131 ELIM, shows current local loopback signal received from the DTE as On or Off; otherwise, shows N/A.
Interface RL Signal	For an L130 or L131 ELIM, shows current remote loopback signal received from the DTE as On or Off; otherwise, shows N/A.
1) Loopback	In software mode, select Normal, Local, Remote, or Clear All; in hardware mode, this shows loopback status.
2) Loopback Control Mode	Set to Hardware to follow the hardware switch or RL and LL signals and ignore this menu setting; set to Software to follow the software setting and ignore the hardware switch and LL/RL signals
3) Electrical Line Relay	Normally shows the current electrical line status as Open, Closed, or N/A (when redundancy is off); during maintenance, you can select Closed to test the inactive link when the Y cable is removed and test equipment installed

4.13 Interface Status

The Interface Status report provides information about the local and remote interface types, the current data rate, and the controls for the interface type. See Figure 18. To view the 2370 interface status, follow these steps:

1. From the Main Menu type 3, "Interface Status," and press <Enter>.

2. To return to the System Configuration menu, press <Esc>.

```
--------------------------INTERFACE STATUS-----------------------------

Local Interface  (Primary)                  Remote Interface (Primary)
EIA-530                                     EIA-530
Actual Rate (bps): 384000                   Actual Rate (bps): 384000

Inputs:          Outputs:                   Inputs:          Outputs:
RTS:     On      DCD:     On                RTS:     On      DCD:     On
DTR:     On      CTS:     On                DTR:     On      CTS:     On

LL:      Off     TM:      Off               LL:      Off     TM:      Off
RL:      Off     DSR:     On                RL:      Off     DSR:     On
```

Figure 18. Interface Status Screen

For details on the characteristics of your interface, see Chapter 3.

4.14 Link Error Counters

The Link Error Counters screen reports errors that occur on the modem link. See Figure 19 and Table 18. To view the link errors, follow these steps:

1. From the Main menu type 4, "Link Error Counters," and press <Enter>. The Link Error Counters screen appears.

2. To reset the timer and counters, press <Tab>.

3. To return to the Main Menu, press <Esc>.

```
-------------------------LINK ERROR COUNTERS----------------------------

                         Local                        Remote
                         Pri.      Sec.               Pri.      Sec.

Timer DDDD:HH:MM:SS      0:00:06:47                   0:00:06:42

Composite LOS Errors              0                            0
Electrical LOS Errors             0                            0
SQL Rx Errors                     0                            0

BERT Sync Status                 OK                           OK
BERT Sync Count                   0                            0
BERT Bit Errors                   0                            0
BERT BER (1E-9)                   0                            0
BERT Up Time             0:00:06:47                   0:00:06:42

Hit 'TAB' to reset timers and counters, 'ESC' to return to previous menu.
```

Figure 19. Link Error Counters Screen

Table 18. Link Error Counters Definitions

Item	Definition
Timer	Number of days, hours, minutes, and seconds since the last reset
Composite LOS Errors	Number of optical loss of signal errors
Electrical LOS Errors	Number of electrical loss of signal errors
SQL Rx Errors	Number of received squelch occurrences
BERT Sync Status	Reports loss if the BERT out of sync error rate exceeds 10^{E-9} or OK if signal is good
BERT Sync Count	Number of good to faulty patterns
BERT Bit Errors	Number of bits with errors in the received pattern
BERT BER (1E-9)	Number of bit errors during this BERT up time
BERT Up Time	How long BERT is available and running

The Bit Error Rate Test (BERT) sends a continuous sequence to check for bit errors while the optical signal remains in sync.

4.15 System Alarms

The System Alarms screen reports alarms and faults on the local 2370 and the remote 2370. See Figure 20 and Table 19. To view current alarm status, follow these steps:

1. From the Main Menu, type 5, Alarms, and press <Enter>. The System Alarms report appears.

2. To return to the Main Menu, press <Esc>.

```
------------------------------SYSTEM ALARMS-------------------------------

                               Local                    Remote


Modem Redundancy Status        N/A                      N/A
Configuration Errors           No                       No
Fiber Loss of Signal           No                       No
Electrical Loss of Signal      No                       No
SQL Rx                         OK                       OK
Chassis Management             N/A                      N/A
Alarm Relay Inputs             N/A                      N/A
Power Supply Primary           OK                       OK
Power Supply Secondary         N/A                      N/A
Fan                            N/A                      N/A
Power-On Self Test             OK                       OK
```

Figure 20. System Alarms Screen

Table 19. System Alarms Definitions

Item	Definition
Modem Redundancy Status	Reports if redundancy is Active, Inactive, or turned off (N/A)
Configuration Errors	Check that the local and remote modems have compatible set ups, including software version
Fiber Loss of Signal	Checks if optical loss of signal errors
Electrical Loss of Signal	When LOS detection is On, checks if electrical loss of signal occurs
SQL Rx	Checks if squelch occurs
Chassis Management	Reports OK if 2370 is in UCS 1000 with DMM or N/A if 2370 is in 1040, 1050, or UCS 1001
Alarm Relay Inputs	Reports Loss if CLS occurs or OK if signal is good; UCS 1001, only
Power Supply Primary	Reports function of main power supply
Power Supply Secondary	Reports function of second power supply
Fan	Reports fan failure
Power-On Self Test	Reports OK or faulty hardware or software

4.16 Utilities

Use the Utilities screen to set values for general parameters and to run the diagnostic PING. See Figure 21 and Table 20. To access the Utilities screen, follow this step:

1. From the Main Menu, type 6, Utilities, and press <Enter>. The Utilities menu appears.

```
------------------------------UTILITIES---------------------------------

1) Set Date and Time
2) Change Password
3) VT100 Baud Rate                  19200
4) Modem/Slip/PPP Baud Rate         19200
5) Modem Initialization String      AT
6) Reset Configuration To Default
7) Copy Configuration
8) PING Generation
```

Figure 21. Utilities Menu Screen

Table 20. Utilities Menu Options

Item	Definition
1) Set Date and Time	Change the time and date information for the modem if needed; if in a chassis with a DMM, the DMM date and time overrides the 2370
2) Change Password	Add, delete, or update the password for the user interface
3) VT100 Baud Rate	Select the baud rate, 9600 or 19200 bps, for a VT100 terminal connection
4) Modem/Slip/PPP Baud Rate	Select the baud rate, 9600, 19200, 38400, 57600, or 115200 bps for the modem/SLIP/PPP serial port
5) Modem Initialization String	The default string is "at"
6) Reset Configuration To Default	Restores all configurable settings to the defaults except for: date and time; password; BOOTP; Telnet timeout
7) Copy Configuration	Copy the alarm override configuration to the remote modem
8) PING Generation	Go to the PING Generation screen

4.17 PING

Use the PING Generation screen to test the connection to a specific IP address. To use the PING option, see Figure 20 and follow these steps:

```
----------PING Generation---------------------------------

IP Address to PING: 0.0.0.0
PING count (1 to 255, 0 = forever):  0

Use TAB key to move to other field,
and ENTER to validate.
```

Figure 22. PING Generation Screen

1. From the Main Menu, type 6, Utilities, and press <Enter>.
2. From the Utilities menu, type 8, PING Generation, and press <Enter>.
3. At the prompt, type the IP address to PING and press <Tab>.
4. At the prompt, type the number of times to send a PING, from 1 to 256, or type 0 to PING continuously every 3 seconds, and press <Enter>.
   "PING response received..." indicates a good connection;
   "TIMEOUT: Unable to reach [IP address]..." indicates a faulty connection.
5. To stop the PING and return to the Utilities menu, press <Esc>.

4.18 Software Upgrade

Use the Software Upgrade screen to check the current version of the firmware and upgrade it and the remote 2370, if necessary. See Figure 23. To access the Software Upgrade screen and check the software version, follow these steps:

1. From the Main Menu, type 7, Software Upgrade, and press <Enter>. The Software Upgrade screen appears.

```
--------------------------SOFTWARE UPGRADE------------------------------

                        Local                       Remote
                        Pri Offline  Sec.           Pri Offline  Sec.
                        Last Data                   Last Data    Last Data
Active Firmware         01.00                       01.00
Inactive Firmware       01.01                       01.01
Bootcode                05.00                       05.00

1)  Software Reset      Reset        Reset          Reset        Reset
2)  Swap Bank           Swap         Swap           Swap         Swap

3)  Copy Software from Source modem to Destination modem
4)  Get New File with TFTP
```

Figure 23. Software Upgrade Screen

2. Record the numbers for the Active and Inactive Firmware for both the local and remote modems.

3. Access the Canoga Perkins Web site, click Downloads, scroll to the 2370 file name and compare the version numbers listed there with the version numbers you recorded. The 2370 firmware file name is similar to `23x00106.zip`, where 23x0 indicates the product type and 0106 indicates the version number.

Caution: ***To ensure compatibility when two or more units are connected, you must upgrade all connected units with the same software.***

If the firmware on the 2370 is outdated, you need to upgrade it. If the 2370 is in a chassis or standalone enclosure within a domain with a DMM, go to the User Manual for the DMM and use that procedure to install the new software. If the 2370 is in a Model 1040, follow these steps:

1. Access the SNMP Configuration menu before starting the software upgrade: enter the IP address, subnet Mask, and default gateway for the SNMP agent.

2. From the Main Menu, type `7`, Upgrade Software, and press <Enter>.

3. At the Software Upgrade menu, type `4`, Get New File with TFTP, and press <Enter>.

4. At the prompt, type the IP address for the source of the software.

5. At the prompt, type `Y` to confirm the choice.

6. If the file name differs from the default, type it and press <Enter> or press <Enter> to accept the default.

7. At the prompt, type `Y` to start the upgrade.

To upgrade a remote unit to the same version of software, follow these steps:

1. Make sure that the remote modem is online.

2. From the Main Menu, type `7`, Upgrade Software, and press <Enter>.

3. At the Software Upgrade menu, type `3`, Copy Software from Source modem to Destination modem, and press <Enter>.

4. At the prompt, select the Source modem, then the Destination modem, and press <Enter>; the upgrade runs automatically.

To run the new software, swap banks, and reset the modem, follow these steps:

1. Check the version of the Inactive Firmware for the Remote modem to be sure that the upgrade is complete.

2. From the Main Menu, type `7`, Upgrade Software, and press <Enter>.

3. At the Software Upgrade menu, type `2`, Swap Bank, and press <Enter>.

4. At the Software Upgrade menu, type `1`, Software Reset, and press <Enter>. The modem resets and starts using the new firmware.

Chapter 5
Troubleshooting

Use the diagnostic procedures in this section to test and troubleshoot the 2370. Before starting the diagnostics, obtain this equipment:

- Multimeter
- Fiber Optic Power Meter
- Short (1 m or less) fiber optic jumper cable
- Bit Error Rate Tester (BERT)

Table 21 lists troubleshooting strategies for various symptoms.

Table 21. Symptoms With Possible Causes and Actions

Symptom	Possible cause(s)	Corrective action
No power indicator on front panel(s)	No AC power	Check AC power source
	Defective modem	Replace modem
Local or Remote sync error	Faulty modem, cable or connector. If the modems are configured in a tail circuit (one is externally locked and the other is slave), verify that the externally locked modem has a clock on its TT (or equivalent) leads that matches its rate switch.	Run Loopback and BERT tests
Cable loss exceeds modem loss budget	Faulty fiber optic cable	Replace defective cable
	Faulty fiber optic connector	Polish or replace connector
Loopback test passes, but modems will not pass data	Modem not configured properly	Check and correct switch and jumper settings on all devices
	Interface cables damaged or wired incorrectly	Repair or replace cables
Modem fails BERT test when optically looped back to itself	Faulty modem or electrical interface	Replace faulty modem
Modem fails BERT when looped locally	Faulty modem or electrical interface	Replace faulty modem

5.1 Loopback Tests

Use loopback to diagnose a fault on the optical link, either on a modem or with a cable. The 2370 supports both local and remote loopback. Local loopback loops the data internally; remote loopback loops the data at the remote modem. Set loopback either in software at the Diagnostics screen for a managed 2370 or, if the Loopback control Mode on the Diagnostics screen is set to Hardware, at the F1/NRM/F2 (Local/Normal/Remote loopback) switch on a Model 1040 enclosure. See Figures 24 and 25.

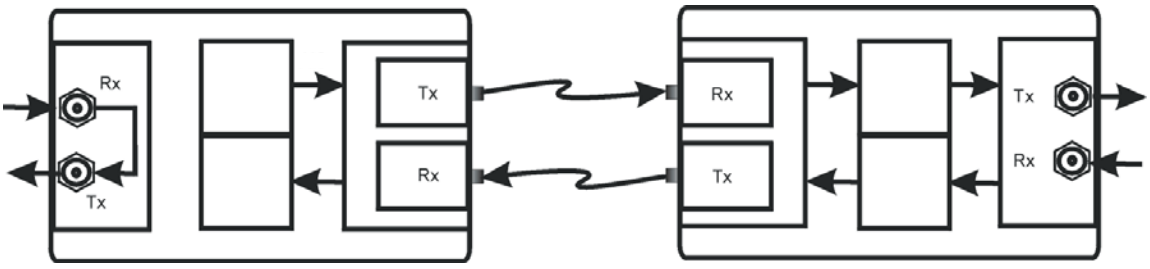

Figure 24. Local Loopback

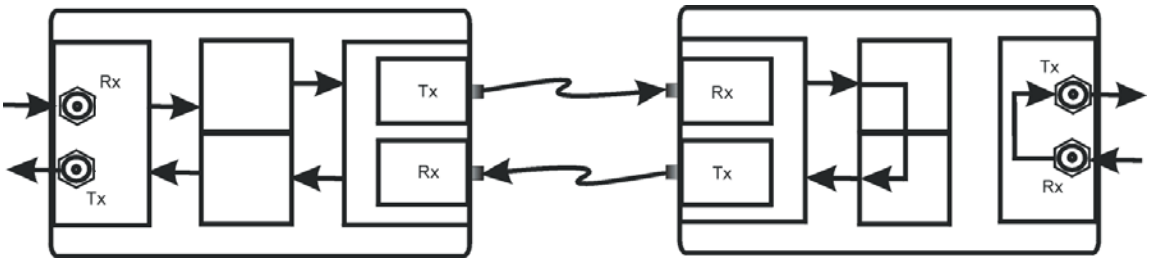

Figure 25. Remote Loopback

5.2 Optical Power and BERT Tests

To optically test the modem, cables, and connectors, follow these steps:

1. Verify the optical cable loss:

    a. Clean the connectors on the fiber optic test cable before plugging it in to the Tx connector on the 2370.

    b. Warm up each component for at least 30 minutes.

    c. Set the optical power meter to the proper wavelength.

    d. Wait two or three minutes for the power reading to stabilize, and then read the output power.

    e. Subtract out the test cable loss, then record the power level and compare it to the value on the performance sheet for that particular 2370. Measurement tolerance is +/- 0.5 dBm.

Note: When referencing optical power levels with numerical values less than zero, the reading closer to zero is the greater value; for example, -17 dBm is greater than -20 dBm.

f. If the reading is incorrect, repeat the measurement with a different test cable. If the power level is still not within range, call Technical Support.

If you know the link attenuation, subtract that value from the 2370 Tx output value to determine the power expected at the remote cable end, which is the input power at the remote receiver, and skip this section. Otherwise, continue these steps to use the 2370 to measure the link attenuation.

g. At the local site, connect the fiber link cable to Tx on the 2370.

h. At the remote site, set the optical power meter to the proper wavelength and connect it to the fiber link cable.

i. Record the optical power level and compare it with the sensitivity level listed on the data sheet for the link fiber type.

j. Subtract the remote power level from the value for the transmitter output power at the local site. The result provides the link loss, in dB. This power level must not exceed the limit for Rx sensitivity listed on the data sheet for the remote unit.

Note: If you cannot determine the Rx sensitivity, contact Canoga Perkins Technical Support Department for assistance.

k. Repeat this process at the other site.

2. If the cable loss exceeds the loss budget for the modem, either a cable or a connector is faulty. If the cable loss is within specification, follow these steps to run the loopback test; for details, see Section 4.12:

   a. At the Diagnostics screen, set the near-end modem to Remote Loopback.

   b. Set the BERT tester for the clocking, data rate, and format used for the circuit; use the existing interface cables if possible.

   c. Connect the BERT tester in place of the near-end device and run the BERT test.

3. If the remote loopback and BERT tests pass, optically loop back each modem and repeat the BERT test. If the test fails, the modem is faulty.

4. If the optical loop back and BERT tests pass, set Local loopback on each modem and repeat the BERT test. If the test fails, the modem is faulty.

5.3 Fiber Optic Diagnostics

If the Loopback Test passes, but the modems still fail, make these checks:

- Check that the fiber optic cables are connected in the standard Tx to Rx and Rx to Tx scheme and labeled near each end with the signal direction, source, and destination.
- Check that the data rate is set correctly.
- Check that the operating mode (internal/external/slave) is set for synchronous transmission or that the circuit is set for asynchronous transmission.

If the problem persists, contact Canoga Perkins Technical Support.

Chapter 6
Specifications

6.1 Optical

Composite Error Rate:	$>10^{-12}$	
Fiber Optic Cable Compatibility:	1310 nm MM 1310 nm SM 1550 nm SM	
Transmitter:	Laser diode (1310 or 1550 nm)	
Fiber Optic Connector:	ST or SC	
Fiber Optic Receiver:	1310 nm Laser	PIN (InGaAs)
	1550 nm Laser	PIN (InGaAs)

Typical Fiber Optic Link Loss Budget:

1310 nm 10 dB SM
1310 nm 11 dB MM
1310 nm 26 dB SM
1550 nm 30 dB SM

Typical Launch Power and Rx Sensitivity

Optic Type	Launch Power (dBm) Hi/Lo	Rx Sensitivity (dBm)
1310 LP Laser	-14/-20	-32
1310 LP Laser	-8/-15	-32
1310 HP Laser	0/-5	-34
1550 HP Laser	0/-2	-34

6.2 Electrical

Interface Connector:	Interface	Connector Type
	EIA-232C / 423 /530	DB-25
	EIA-422 (422)	DC-37
	V.35	DB-25 with MRC-34 adapter
	TTL / BNC	BNC
	T1 / E1	DA-15 or RJ-48C

Interfaces Supported:	RS-232D / RS-423	
	RS-449	
	CCITT V.35	
	TTL / BNC	
	TwinAx 422	
	TwinAx MIL-STD-188-114C	
	Transparent T1 / E1	
	RS-530	
Power Requirement:	Standalone	115 VAC ±10% at 0.22 Amps
		115/230 VAC ± 10% switchable at 0.11 Amps ,47 to 63 Hz
	Rack Mount PC Card	18 VAC ±10% at 1.1 Amps per board, 50 to 64 H

Table 22. RJ-45 Pinout

Pin	Signal	Source	Path
1	RI	DTE	Out
2	DCD	DCE	Out
3	DTR	DTE	In
4	SIG GND	DTE	In
5	RXD	DCE	Out
6	TXD	DTE	In
7	CTS	DCE	Out
8	RTS	DTE	In

6.3 Physical / Environmental

Dimensions:	7.9" H x 1.0" W x 10.4" D (201 mm x 25 mm x 264 mm)
Weight:	0.9 lb (0.41 kg)
Operating Environment:	
Temperature	0 to 50° C
Humidity	Up to 95% (non-condensing)

6.4 Modem Configurations

2370 Universal Fiber Optic Modem	
Model	**Description**
2370-1213	1310 nm, MM, SC, 11 dB
2370-1313	1310 nm, SM, SC, 10 dB
2370-1333	1310 nm, SM, SC, 26 dB
2370-1543	1550 nm, SM, SC, 30 dB
2370-1211	1310 nm, MM, ST, 11 dB
2370-1311	1310 nm, SM, ST, 10 dB
2370-1331	1310 nm, SM, ST, 26 dB
2370-1541	1550 nm, SM, ST, 30 dB
2370-1354	Single Fiber, SM, SC, 1310 nm, up to 20 Km
2370-1564	Single Fiber, SM, SC, 1550 nm, up to 20 Km
2370-1374	Single Fiber, SM, SC, 1310 nm, up to 40 Km
2370-1584	Single Fiber, SM, SC, 1550 nm, up to 40 Km
CWDM Ready 2370 Universal Fiber Optic Modem	
2370-1070	CWDM 1470 nm, SM, SC, 30 dB
2370-1071	CWDM 1490 nm, SM, SC, 30 dB
2370-1072	CWDM 1510 nm, SM, SC, 30 dB
2370-1073	CWDM 1530 nm, SM, SC, 30 dB
2370-1074	CWDM 1550 nm, SM, SC, 30 dB
2370-1075	CWDM 1570 nm, SM, SC, 30 dB
2370-1076	CWDM 1590 nm, SM, SC, 30 dB
2370-1077	CWDM 1610 nm, SM, SC, 30 dB

L13x ELIMs

Model	Interface Description
L130	Configurable EIA232/423/530/P53/449/V35
L131	EIA422 DC37 with control
L132	EIA422 TwinAx
L133	TTL BNC
L134	T1 RJ45
L135	T1 DA15
L136	E1 RJ45
L137	E1 DA15
L138	EIA422 DC37 without controls
L139	T88 TwinAx

Appendix A
Warranty Information

Current Warranty information is available on-line in the Client Login Area of the Canoga Perkins web site (www.canoga.com) or by contacting Technical Support at 800-360-6642 (voice) or fiber@canoga.com (email).

CANOGA PERKINS CORPORATION

20600 Prairie Street
Chatsworth, California 91311-6008 USA

Phone: (818) 718-6300 FAX: (818) 718-6312

Web Site: www.canoga.com

Email: fiber@canoga.com